

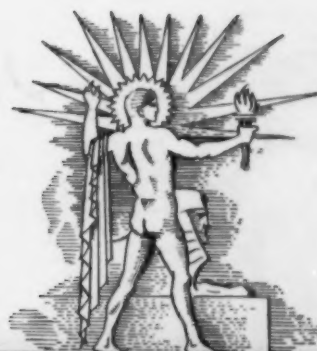
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# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



MARCH 31, 1934

The Earth Cracks

See Page 207

A

SCIENCE SERVICE PUBLICATION

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VOL. XXV

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Summary of Science

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## DO YOU KNOW?

In the Arctic, February is the coldest month.

More than a pound of pure vitamin C in the form of ascorbic acid has been prepared from paprika.

A concern in Holland claims to have evolved a photochemical process for printing designs on fabrics.

The palace of the Soviets to be built in Moscow will be the world's tallest building, according to the plans.

Government scientists have perfected a method for recovering milk albumen from sweet whey, so that it can be used in baby foods.

Scientific tests show that light from the red end of the spectrum darkens apple juice and has a good effect on the flavor, whereas light from the blue end bleaches the juice and ruins the flavor.

Czechoslovakia is experimenting with glass as a raw material in roadbuilding.

Among recent important textile discoveries is a new type of cloth, a substitute for linen.

Demand for methanol in Japan has so increased that efforts are being made to produce it synthetically.

Roman emperors at times staged exhibitions of their rare art possessions in the Forum or the Colosseum.

New York is trying the method of stopping all vehicle traffic at intervals at intersections, so that pedestrians may cross in safety.

The weather vane on the Empire State Building in New York, 1,265 feet above ground, is said to be the highest weather vane in the world, compared with its surroundings.

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What is a centurio bat? p. 196.

These curiosity-arousing questions show at a glance the wide field of scientific activity from which this week's news comes. Book references in italic type are not sources of information for the article, but the references for further reading. Books cited can be supplied by Book Department, Science News Letter, at publishers' prices.

## ASTRONOMY

# Glass for Largest Telescope Disk Begins 10-Month Cooling

**Pouring of Seventeen-Foot Diameter Mass Accomplished At Corning With Only Slight Mishap**

**L**ADLING out molten white hot glass, four hundred pounds at a time, like soup from some infernal caldron, workmen at the Corning Glass Works, Corning, N. Y., poured what they hope will be the world's largest telescope mirror.

Dozens of famous scientists and hundreds of other visitors, saw the twenty tons of glass poured into the seventeen foot mold in which it will cool until ten months have passed. Not until then will it be known whether the event was really successful. Despite the most careful preparations, there is always the chance that the large mass of glass may crack while it is cooling.

One mishap occurred during the pouring, but Dr. John C. Hostetter, director of research of the Corning Company, expressed the belief that it would not be serious. The mold in which the glass was poured has its bottom covered with numerous cores, making it look like a city of Eskimo snow houses. These cores were covered with molten glass in order that the finished disk will not have a solid back but a series of ridges. This permits the disk to be made much lighter than if it were solid glass and the holes formed where the cores project upwards are to be used for supporting the mirror. After about half the glass had been poured into the mold, several of the cores worked loose from their moorings on the bottom of the mold. When the doors to the fire brick "beehive" covering the mold were opened to admit more ladles of glass, they could be seen floating about on the surface of the glass inside. Dr. Hostetter said that this would not affect the success of the mirror although it was unfortunate.

As soon as the pouring was completed, the loose cores were fished out of the taffy-like mass. The whole disk will be allowed to cool without them. After cooling, this part of the glass will be solid and then holes will be drilled corresponding to the places where the cores would have been.

After the glass was poured into the mold, the entire mold was lowered on

four screws into the cellar below. Then it was moved about forty feet and lifted from below into the annealing oven. The bottom of the mold and the sides and top of the oven are lined with electrical heating elements which will be gradually turned down.

After successful cooling, the disk will be sent to Pasadena, Calif., where several years will be required to grind it to the accurate dish shape required to pick up the rays of starlight and focus them accurately fifty-five feet above. The grinding and building of the telescope will be done in the shops of the California Institute of Technology. So far the exact location of the finished telescope has not been determined, but it will doubtless be on a mountain top in southern California.

*Science News Letter, March 31, 1934*

## ANATOMY

## Growth Spurt Made When Right Height Reached

**B**OYS and girls start their adolescent spurt of growing when they have reached a certain height rather than at a certain age. This finding was reported by Dr. Carroll E. Palmer, of

the U. S. Public Health Service and the Johns Hopkins School of Hygiene and Public Health, at the meeting of the American Association of Anatomists in Philadelphia.

Dr. Palmer analyzed annual measurements made during a period of four to seven years on about 2,500 elementary school children between the ages of 6 and 14 years.

The adolescent acceleration of growth begins, apparently independent of age, when girls and boys reach an average height of 50 and 53 inches, respectively, he found. From the age of six years to the start of this adolescent growing spurt there is practically no association between the average gain in height and that height already attained by the child.

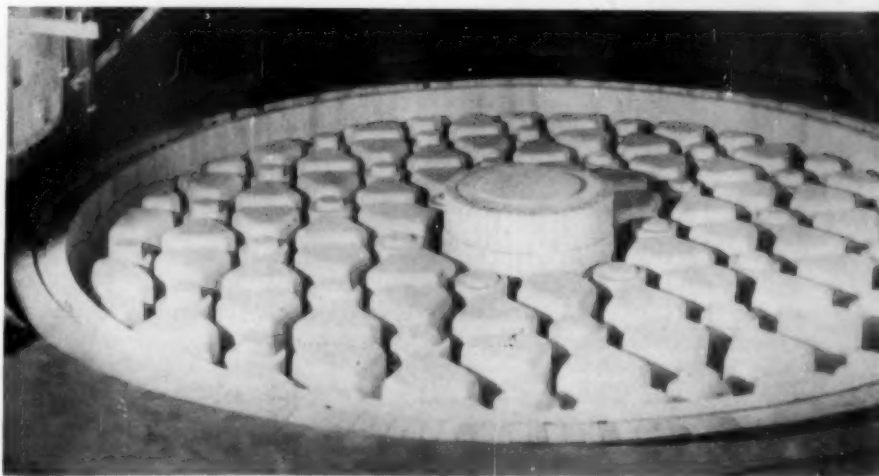
*Science News Letter, March 31, 1934*

## GEOLOGY

## Buried Hundreds of Years, Log Not Petrified

**W**OOD buried in travertine, the material which forms the famous hot springs terraces of Yellowstone National Park, apparently does not petrify. Dr. C. Max Bauer, park naturalist of the Yellowstone, is authority for this statement.

The park headquarters development at Mammoth Hot Springs is located on old hot springs deposits, laid down many hundreds of years ago. CWA workmen digging a trench to lay a new water main came upon the top of an old tree, eighteen inches in diameter. This was discovered three feet below the surface. Dr. Bauer states that while the exterior of the log had rotted and disappeared, the interior was remark-



**READY FOR MOLTEN GLASS**

The mold into which glass was poured for the world's largest telescope mirror is pictured in casting position. The "bee hive" furnace has been rolled back.



ably well-preserved and the tree, although hundreds of years buried, was not petrified.

The upper portion of the imprint in the rock is that of a decayed top, indicating that the tree must have been dead before the deposits covered it. A limb about eight inches in diameter originally extended more than ten feet into the formation, as shown by the cavity still in evidence.

At another place a feather, resembling the gray wing-feather of the modern nutcracker, was found two feet deep in the travertine.

The hot springs terraces at Mammoth Hot Springs are built up by the hot waters which deposit the travertine, or carbonate of lime, as they flow out of the springs. Under favorable conditions the travertine is deposited very rapidly, objects left in the hot waters as they emerge from the spring showing a substantial coating in a day or two.

*Science News Letter, March 31, 1934*

#### MEDICINE

## Sera Processed to Keep Longer at Full Strength

**New Method Uses Rapid Freezing and Vacuum Sealing; Proteins, Enzymes and Similar Products May be Treated**

**D**OG-TEAM and airplane dashes to Alaska with diphtheria antitoxin or serum for fighting other diseases will become a thing of the past as the result of a new development reported to the American Chemical Society meeting in St. Petersburg, Fla., this week.

A method and apparatus which makes it possible to preserve for a very long time such biological products as diphtheria antitoxin and anti-typhoid serum has been developed by Drs. Earl W. Flosdorf, Stuart Mudd, John Reichel and Harry Eagle of the University of Pennsylvania School of Medicine. Tests indicate that by this new method the sera can be kept much longer than usual without any lessening in potency at temperatures as high as 120 degrees Fahrenheit. This will be invaluable for shipping and storage of serum in the tropics, it was pointed out.

A much wider exploration of the uses of human convalescent serum for prevention and treatment of disease is now possible and such studies are being carried on in Philadelphia, he continued.

"Heretofore, convalescent serum from one epidemic, if drawn at time of optimum potency, deteriorated on storage until needed for the next epidemic. If not drawn until needed, a serum of inferior potency was obtained. It is now possible to draw the serum at time of optimum potency and, by subjecting it to the process to be described, keep it in its original condition until such time as it may be required for use.

"The results on measles, the only disease for which clinical results are as yet available and which will be reported by others, are very encouraging.

"Proteins, enzymes, and many other biological products have also been successfully processed. The method should prove to be of use generally in the field of biological chemistry, both for purposes of preservation and concentration."

The method of preparation involves freezing sterile serum at 100 degrees below zero Fahrenheit and rapidly removing the contained water under high vacuum. The containers are then sealed off under vacuum by a method similar to that used in manufacturing radio bulbs. In this way the serum can be kept in a sterile condition in vacuum.

When the serum is needed for use, sterile distilled water is admitted with a needle and syringe by plunging the needle through the rubber stopper into the container. The serum, which quickly dissolves, may then be drawn into the syringe and is ready for injection.

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Rhodium, an attractive white metal, is gaining vogue in Germany as plating for inexpensive jewelry.

Merely girdling or felling trees affected with heart rot will not eradicate the disease, says a plant pathologist, because fungi causing the rot will live in the dead stumps and trees for more than five years.

#### ARCHAEOLOGY

## Art Masterpieces Found Preserved by Mud

**T**WO GREAT carved altars, masterpieces of prehistoric American art, have been discovered at the ruins of Quirigua, Guatemala, by Earl H. Morris, archaeologist of the Carnegie Institution of Washington. The Institution stated that the stone altars date to a very early period of Mayan history.

On each altar block, an unknown Indian Phidias sculptured the large form of a human being in distorted posture, elaborately clad and wearing a large and complicated headdress with face mask. The remaining surface of the slab was used to record a long and delicately wrought inscription in Mayan hieroglyphs, with serpent motifs around the margin. Both altars are very large, one being eleven feet by twelve and one-third, and almost two feet thick.

Mr. Morris made the discovery while tunneling under a carved stone monument, in hope of finding a cache containing things of archaeological interest. The backwash of the Montagua River, nearby, had deposited thick mud over the lower portions of the city ruins, covering the altars and preserving them from centuries of weathering.

Mr. Morris is representing the Carnegie Institution in a joint project with the Guatemalan Government to re-erect the fallen monuments of Quirigua and clear the site for preservation and study.

*Science News Letter, March 31, 1934*

#### ZOOLOGY

## Rare White-Shouldered Bat Acquired by Museum

**A** SPECIMEN of the centurio bat, a creature so rare that in the hundred years it has been known to science only a dozen have been taken, has been captured by the Leon Mandel Guatemalan Expedition of the Field Museum of Natural History, according to word received in Chicago from its leader, Karl P. Schmidt. The animal has white patches on its shoulders, which suggested to the Spanish scientists who first studied it the white epaulets worn by centurions of ancient Roman legions.

Another animal obtained by the expedition is a flying squirrel species so rare that only two or three other specimens are known in all the world's zoological collections.

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## ANTHROPOLOGY

**Hrdlicka's Studies Upset Idea of Human Body**

**N**EW, fundamental light regarding the human body, upsetting old, accepted ideas, was announced by Dr. Ales Hrdlicka of the Smithsonian Institution in an address before the Anthropological Society of Washington.

Latest researches reveal that every feature of the body, however tiny, has a range of variation of size, weight, or make-up which is normal. That is, instead of there being a single normal size for a bone or nerve or cell there is a broad avenue of sizes which includes the normal. The very molecules of the body may be found to vary within the limitations of what is normal.

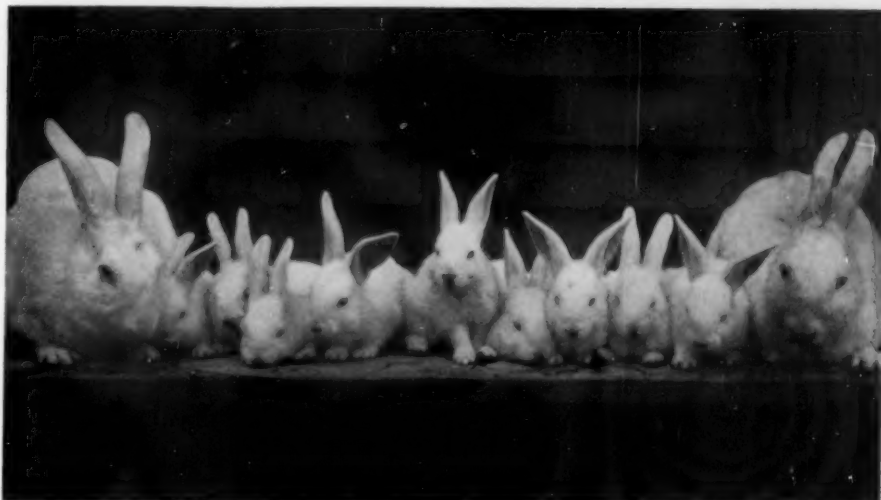
From studies so far made along this line, Dr. Hrdlicka has found that the ranges of what is normal are the same for living races all over the world. "This is deeply significant," he explained. "It shows that living men are all of one species. It shows that our fundamental characters are deeply fixed, not merely recent acquisitions, but older than the modern races."

This new field of anthropology will require study for many years, even generations, Dr. Hrdlicka said. The possibilities have been discovered now because for the first time in anthropological history material in sufficient quantities is available for study. Where, in the past, anthropologists examined a few dozen bones to decide a point, they now study not dozens or hundreds but thousands.

Another striking and important discovery, made possible by exceptional collections in the Smithsonian Institution, is that every character of man has its own complete and unceasing life history.

"It has always been considered that human characteristics become fixed and finished when adulthood is reached," Dr. Hrdlicka stated. "In these new collections we have sufficient juvenile material of all stages of growth and also fairly sufficient material showing different ages of the adult, into senility. All of this is now showing that every feature—teeth, hair, bones—changes without cessation from the beginning of life, before birth, to the oldest age. Every feature has its definite life curve or life cycle. The change may be slower and less marked in some features than in others, but it never ceases."

*Science News Letter, March 31, 1934*



**NINEFOLD EASTER GREETINGS** Photo by Cornelia Clarke

*Rabbits, especially white rabbits, have become such an inseparable part of the modern symbolism of Eastertide that most of us have forgotten that their connection with the feast is ancient—older indeed than the feast itself as a Christian observance. For rabbits, along with eggs, chicks, flowers and other springtime fertility-symbols, go far back into the world's primeval twilight, not only earlier than Easter, but earlier than the Jewish Passover, which was the tragic occasion of the first Easter.*

## CHEMISTRY

**Plant Swallows Sea, Digests Bromine From Its Waters**

**C**HESTERTON, in his "Ballad of the White Horse," makes allusion to the towering imagination in the ancient Irish bardic poetry:

"Tales where a man can swallow the sea  
"That might swallow the Seraphim."

Such a sea-swallowing stunt is at least partly realized, if not by a man then at least by one of man's works, in a new bromine-producing plant established by the Dow Chemical Company at Wilmington, N. C., and described before the meeting of the American Chemical Society by Willard H. Dow and LeRoy C. Stewart.

For this plant daily pumps through itself a literal river of salt sea water, drawing it from the ocean and discharging it again into the Cape Fear River. More than a third of a billion pounds of water—175,000 tons, or enough to float all the heavy-gun cruisers in the U. S. Navy—is sucked in daily by its monster pumps, and comes tumbling out of its discharge gates. What happens to it on the way through explains why this sober industrial chemical company has done such an apparently fantastic thing.

For the sea water is made to yield

10,000 pounds of bromine every day, by dumping into it half that quantity of the cheaper element chlorine. The chlorine has a more powerful attraction for the elements that are united with the bromine in the sea water, forces a chemical divorce, and leaves the bromine free to come out of solution, when it is captured, condensed and prepared for market. Before chlorine is added, the sea water is made slightly acid with sulfuric acid.

Bromine is a brown substance, which hovers between gaseous and solid states at ordinary temperatures. All of the bromine from sea water is now used in making tetraethyl lead for "ethyl gas" antiknock motor fuel. Bromine is also used in photography, in medicine and antiseptics and in many other ways. Although it is present in sea water in such thin dilution that 175,000 tons of the water will yield only five tons of the chemical, the new process of extraction is so simple as to make the plant profitable, though it works what amounts to the lowest-grade "ore" in the world, with the exception of ores such as pitchblende that yields radium, and South African blue clay containing diamonds.

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## ANTHROPOLOGY

## Nordics May Owe Features To Sufficient Iodine in Diet

**D**OES THE PROUD Nordic, whose long-shaped head is a badge of his racial identity, owe that head shape to getting enough iodine in his diet?

It seems a possible conclusion, if the newest theory on head form is accepted by science.

The theory is advanced by Dr. Knight Dunlap, professor of psychology at the Johns Hopkins University, in *Science*.

Dr. Dunlap observed that the conspicuous goiter belts of the world are areas where broad-headed individuals prevail. The Swiss Alps and nearby regions in France, Germany, Italy, and Austria form one goiter belt. The Great Lakes region is another. Certain parts of the Scandinavian countries, and some mountainous regions of India, are notable for the commonness of goiter.

Delving further into ethnic geography, Dr. Dunlap found that other areas conspicuous for broadheaded people also report considerable goiter.

### Principle Sought

The combination of facts seemed to him significant, and he sought the principle of human development involved.

The goiter belts are characterized by a deficiency of seafood in the people's diet. This iodine lack disturbs the thyroid gland, and the result is goiter. But so closely do the endocrine glands work together, Dr. Dunlap points out, that if the thyroid is disturbed, the balance or pattern of the whole endocrine system would be disturbed. Since these glands control growth, and since head form is a growth characteristic, he reasons that glandular disturbance causes the shape of the head to broaden.

### Long and Broad of It

Summed up, the theory is that broad-headedness is a result of glandular adaptation to a certain environment.

An explanation of why certain human stocks and groups have long heads or broad heads would be of great usefulness to anthropologists, who are studying the world's people, past and present. Dr. Dunlap's explanation, he says, seems to clear up some problems of head form, and to complicate others.

When a people who have been broad-

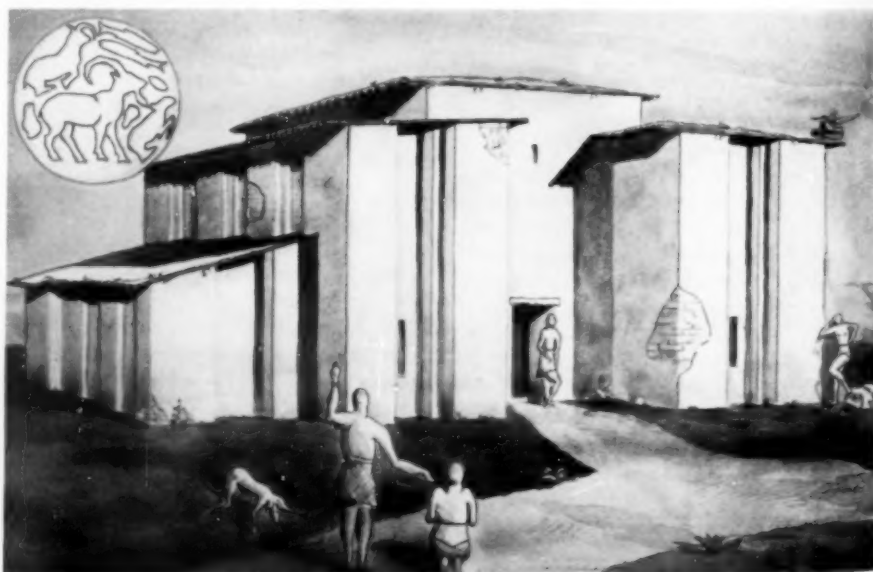
heads for generations later become long-heads, does that mean that they have become adapted to their environment? This is the view that Dr. Dunlap advances. It puts a different light on Indian and Negro anthropological studies. Anthropologists who have studied the changes in head form in ancient Indian settlements or in Negro tribes have attributed a change, usually, to the coming of immigrants into the group, or to an entire new group replacing the old. Now, anthropologists may have to consider the importance of the glands in shaping heads.

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## ARCHAEOLOGY

## Temple of Antiquity Restored in Drawing

**S**TUMPS of walls and the ground plan of one of the world's oldest temples were a remarkable discovery unearthed at Tepe Gawra, Mesopotamia, by the joint expedition from the University of Pennsylvania Museum and the American Schools of Oriental Research. After careful research by the field director, Charles Bache, and the architect of the expedition, E. B. Müller, a drawing of the building, reproduced on this page, has been made.



ANCIENT TEMPLE OF THE EAST

Mr. Müller says that using the known plan he could have completed the building in about ten ways. He chose the one with the simplest roof, commenting that in any restoration, the temple is impressive and shows what excellent architects the Gawrans were.

The temple ruins were found in the ninth layer of ruins counting from the top of the site, and the antiquity of the temple is at least from 3500 B. C.

The seal of this temple (insert) was impressed in mud and attached to the cord on the sacks of grain or other offerings brought to the temple.

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## CHEMISTRY—PHYSICS

## Triple Weight Hydrogen Rare At Princeton

**P**RINCETON scientists have searched carefully for the new triple weight hydrogen (tritium) which Lord Rutherford recently announced had probably been synthetically produced by bombardment experiments with deuterons or the hearts of double weight hydrogen. But they are sure that hydrogen of mass 3 does not occur in ordinary water more plentifully than one part in 500,000,000.

The mass spectrograph researches of Dr. Walker Bleakney and A. J. Gould also show that in the purest heavy water thus far obtained the concentration of this third hydrogen is less than one part in 50,000. Double weight hydrogen or deuterium occurs one part in 5,000 in common hydrogen on earth.

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PHYSIOLOGY

# Tadpole Studies Show What Alcohol Does to Nerves

**Lastingly Hurt by "Spree" But Little Harmed By Mild Drinking, Virginia Scientist Reveals**

**L**ITTLE or no perceptible harm is done to the nerves by mild, daily drinking of alcoholic beverages, but permanent damage is done by the alcohol consumed on a "spree." These facts, observed on frog tadpoles, but nevertheless applicable to man, were reported by Dr. C. C. Speidel, professor of anatomy at the University of Virginia Medical School.

The question of just what happens to the nerves during alcoholic intoxication is important because of the fact that the mental processes, the coordinating mechanism, the senses and control of muscles and movements, which are all known to be affected by alcohol, are intimately related to the proper functioning of the nerve cells.

## Maps Nerves Day by Day

Dr. Speidel has for several years been observing directly the behavior of nerves in living organisms, using small frog tadpoles whose nerves are constructed essentially on the same plan as man's nerves. What he does is anesthetize the animal slightly and place it on a specially prepared microscopic slide. Then he observes the individual nerve fibers in the transparent tail fin, using very high magnification. From this observation, Dr. Speidel makes a map of the nerves. The animal is then replaced

in pond water and on the next day the same region and the same nerves are again studied. By this method, histories of individual nerve fibers over a period of several months may be obtained.

"A conspicuous feature of a mature fiber is the myelin sheath, a fatty covering which encases the nerve fiber and protects, insulates and nourishes it," Dr. Speidel explained. "This sheath is in the form of segments arranged somewhat like a string of sausages. As it responds quickly to irritation of almost any sort, it is an excellent indicator of alcohol effects. It may degenerate or partially degenerate, even though the nerve axis within remains alive. It never persists, however, if the nerve axis degenerates."

Dr. Speidel found that in very dilute alcohol, less than five-tenths of one per cent., tadpoles may live indefinitely with little or no indication of any special nerve irritation. In much stronger alcohol solutions, more than three per cent., death usually ensues within an hour or two. Alcohol solutions in the neighborhood of two per cent. brought on marked changes in the nerves, such as marked swelling, undulating movements of the myelin sheath, appearance of vacuoles, or spaces between the myelin sheath and the enclosed nerve axis, followed by gradual separation of these structures, and an assumption of an irregular wavy course by the nerve axis.

## Explains Actions of Drunk

In strong alcoholic intoxication, the myelin sheath separates from the nerve axis. According to one theory, the surface of junction of the myelin sheath and the nerve axis plays the chief role in conducting nervous impulses. If this is true, Dr. Speidel's observation that the sheath separates from the axis under strong alcoholic intoxication explains why a drunken man cannot walk or talk straight and is more or less insensible to pain.

The structural changes brought about in the nerve fibers are not specific to

alcohol but are due to the irritation it produces and can be brought about by other irritants.

The complete degeneration of the myelin sheath segments by strong alcoholic intoxication is permanent, but the slight irritative changes from mild daily intoxication of brief duration are quickly repaired, Dr. Speidel found. New sprout growth and new formation and growth of myelin segments may take place on fibers subjected to such irritation.

Dr. Speidel discussed the effects of alcohol on nerves in a radio talk under the auspices of Science Service broadcast over the Columbia Broadcasting System.

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ARCHAEOLOGY

## Notched Bone Apparently Heidelberg Man's Tool

**W**ERE man's earliest tools made of bone rather than stone? Was there a Bone Age before the Stone Age?

A new bone of contention, in a literal as well as a figurative sense, has been found in the gravel beds near Heidelberg that yielded the famous Mauer Jaw, the only actual skeletal remains ever discovered of the Heidelberg race of man, among the oldest human beings in Europe. This bone object, described by Dr. Ilse Voelcker of the University of Heidelberg in the German journal *Forschungen und Fortschritte*, bears notches and other markings that point almost certainly to hand-working and indicate its use as a tool. The bone is about six inches long, roughly pointed at one end, and notched on the other side as if for binding to a handle or shaft.

Dr. Voelcker conjectures that it may have been Heidelberg Man's spear-head; therein disagreeing with Prof. Heinrich Quiring of Berlin, who holds that shafted spears did not come into use until nearly the end of the Old Stone Age, many thousands of years later than Heidelberg Man's time.

The present find is the third bone object with apparent man-made cuttings to be found in the Mauer gravels. It is part of the legbone of a bison. The other two earlier finds were made from the legbones of either horse or moose.

Dr. Voelcker does not regard certain "coliths" found in the Mauer gravels and elsewhere as genuine man-made tools.

*Science News Letter, March 31, 1934*

## ▼ WEATHER AND THE NEW DEAL

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an address by

**W. R. Gregg**

Chief, U. S. Weather Bureau

Wednesday, April 4, at 4:30 p. m., Eastern Standard Time, over Stations of the Columbia Broadcasting System. Each week a prominent scientist speaks over the Columbia System under the auspices of Science Service.

## BIOPHYSICS

**Heavy Water Cuts Down Respiration of Bacteria**

**H**EAVERY water, containing double-weight atoms of hydrogen instead of the commoner single-weight ones, "chokes" bacteria, Prof. E. Newton Harvey and Dr. G. Wellford Taylor, of Princeton University, have found. When two species of luminous bacteria were kept in culture tubes containing mixtures of heavy water and ordinary or light water, the rates at which the organisms used oxygen were reduced, in approximate proportion to the percentage of heavy water in the mixture. A projection of the curve representing the respiration rates indicates that if the bacteria were put into 100 per cent. pure heavy water they would stop using oxygen altogether.

In a condensed summary of their results, Prof. Harvey and Dr. Taylor state that "86 per cent. heavy water containing peptone and salt was found to reduce the respiration of a salt water luminous bacterium 60 per cent.; 63 per cent. heavy water 30 per cent., and 36 per cent. heavy water 12 per cent. Luminescence was diminished markedly in the 86 and 63 per cent. heavy water.

"The respiration of a fresh water form, *Vibrio phosphorescens*, was reduced 30 per cent. in 86 per cent. heavy water and 12 per cent. in 45 per cent. heavy water with no appreciable reduction in phosphorescence."

Full details of the experiments are described in the April issue of the *Journal of Cellular and Comparative Physiology*.

*Science News Letter, March 31, 1934*

## PLANT PATHOLOGY

**Fungus' Instinct Aids Its Struggle For Existence**

**E**VEN the ignominious plant parasite is fearfully endowed with an "instinct" which increases its chances of success in life, according to Dr. Thorvaldur Johnson, pathologist in the Dominion Rust Research Laboratory, Winnipeg. In a report to *Phytopathology*, he shows how a germinating wheat rust spore crosses a wheat leaf in such a way as to give it the best chance to infect the plant.

The germ tube of the germinating rust "seed" crosses the wheat leaf, says Dr. Johnson, at right angles to the

veins. By that procedure the fungus has the maximum chance of arriving at a stoma or "breathing pore," the usual place for infection to take place, in the shortest possible time.

This tendency for a plant parasite to grow in the direction of the greatest number of chances for infection is, according to Dr. Johnson, rather general, so that it seems that there must be a correlation between the construction of the skin of the leaf and the direction in which a germ tube grows.

The motivating stimulus, Dr. Johnson feels, is that of contact. As the germ tube develops, there is developed on its lower surface a sort of hold-fast which in turn insures the development of the tube in the same general direction. Likewise, contact with the ridges of the leaf forces a continuance of growth in a more or less straight line.

*Science News Letter, March 31, 1934*

## SOCIOLOGY

**Japan Growing in Numbers Twice As Fast As U. S.**

**T**HE RATE of increase in population during 1933 for the United States was less than half what it was in Japan, it is announced by the Scripps Foundation for Research in Population Problems. The United States added six new souls for each thousand of population while Japan added 14 per thousand.

The actual gain in numbers was also greater for Japan, amounting to 942,600 during the year, while the increase in the United States was only 797,000. Yet the total population of the United States is estimated to be 126,144,000 on January 1, 1934 as against Japan's 67,470,000.

This situation is in marked contrast to the situation of a decade ago when the rate of population growth was as rapid in the United States as in Japan, and more than twice as many persons were added each year in the United States because of the larger population.

The 1933 death rate in Japan was about 19 per thousand or about 8 points above the United States rate of 11.

The 1933 birth rate of about 33 per thousand in Japan exceeded the United States rate of 18 by about 15 points. The difference in birth rate in favor of Japan has been increasing rapidly; the Japanese rate is as high now as it was 20 years ago while the United States rate has fallen by more than one-third.

*Science News Letter, March 31, 1934*

**IN SCIENCE**

## ARCHAEOLOGY

**Men of Monte Alban Re-shaped Heads and Teeth**

**I**T HASN'T always been the woman who suffers for beauty, scientists can tell you.

Mexican archaeologists who are exploring the cemetery of ancient Monte Alban say that almost every human skull encountered this season has been flattened artificially. Teeth of Monte Alban's ancient inhabitants were filed to points or to other shapes, and inlaid with small round disks of contrasting minerals. Headaches and toothaches were undoubtedly just as painful a thousand years ago in America as they are today. But the Indian men acquired the distinction they coveted at any cost.

It was men alone who rated the honor of burial in the Monte Alban tombs, judging by the size of the bones and other anatomical criteria. In two cases bones from the cemetery are pronounced those of girls. But these, from their arrangement in the tomb, are believed to have been sacrificial child victims, not regular burials. They date from the early part of Monte Alban's history.

*Science News Letter, March 31, 1934*

## CHEMISTRY

**Chemists Study Toxin Of Chicken-Killing Weed**

**C**ONVICTED of poisoning chickens, a southern weed known botanically as *Crotalaria spectabilis* and in common English as rattle-box or rattlesnake-weed, has had its toxic principle extracted and made the subject of study by three University of Florida chemists, Dr. W. M. Neal, C. F. Ahmann and L. L. Rusoff. They reported their findings before the American Chemical Society.

The poisonous stuff belongs to the large group of poisons known as alkaloids. It is a white crystal, that melts at 197 degrees Centigrade, well above the boiling point of water. Experiments showed that it had harmful effects on isolated pieces of heart muscle and on red blood cells.

*Science News Letter, March 31, 1934*



# SCIENCE FIELDS

## CHEMISTRY

## Europium, Rare Element, Has Weight Re-Determined

**E**UROPIUM, one of the rarest of the chemical elements, weighs more than the books say it does. It has had its weight re-determined by two University of Illinois chemists, E. L. Meyers and Prof. B. S. Hopkins, who reported their results to the American Chemical Society.

Because of its extreme rarity and also because it has no present known commercial use, the element has been but little studied. The re-determination by the two chemists raises the figure for its atomic weight from an even 152 to 152.3. This is something over double the atomic weight of copper, which is 63.57, but materially less than the atomic weight of gold, 197.2, and lead, 207.2.

*Science News Letter, March 31, 1934*

## PUBLIC HEALTH

## Disease-Carrying Cup Changes Its Form

**Y**OU MAY have thought that dangerous disease-carrier, the common drinking cup, had disappeared. But it has merely changed its form and still endangers your health in a most insidious way. The editor of the *American Journal of Public Health* calls attention to its fresh menace:

"The common drinking cup has never really been abolished. We still have it, though not in the same form as before. Now it is in the form of glasses, dishes, and tableware inadequately cleansed between servings.

"Go to almost any soda fountain, in any city; watch the attendant pluck a glass from the counter, swish it about hastily in a basin of muddy-looking tepid water, rinse it quickly in cold water, then use it to serve another customer.

"That glass is worse than the common drinking cup! Its superficial washing has served only to bring it into contact with germs from many other

glasses 'washed' in the same water.

"Influenza, the common cold, tuberculosis, pneumonia, scarlet fever, diphtheria, whooping cough, and Vincent's angina, are among the principal diseases that can be transmitted by unclean eating utensils. Pathogenic organisms (disease germs) are not removed by common methods of washing. After they are used and hand washed, more than 20 per cent. of the organisms remain adhering to eating and drinking utensils.

"About 92 per cent. of all communicable diseases are transmitted through the mouth and nose. Surely there is no better place to break the chain of saliva-borne and food-borne infections than at eating and drinking places. . . ."

*Science News Letter, March 31, 1934*

## ETHNOLOGY

## "Fire Nation" Downfall Traced to Pontiac's Murder

**I**DENTITY of the mysterious Mascoutens or "fire people," that Huron Indians talked of intriguingly to early traders and missionaries, has at last been scientifically established.

Starting from a chance clue in the journal of a Frenchman, Dr. Truman Michelson of the Smithsonian Institution has solved the mystery of this lost Indian nation which lived in southern Michigan and Illinois.

Calling these Indians "fire people" has been misleading, Dr. Michelson said. The Hurons were really talking about the "prairie people," but words for fire and prairie were so similar in the Algonquian Indian languages that white men misunderstood.

From clues in old records, Dr. Michelson has established the fact that there actually was a Mascouten tribe, with whom the Hurons had contacts. They were members of the Illinois Confederacy of Algonquian tribes.

Disappearance of the tribe is traced by Dr. Michelson to the time when the great chief Pontiac was murdered by a Kaskaskia Indian, in 1769. Kaskaskias were members of the Illinois Confederacy, and in vengeance for Pontiac's death, four tribes massacred the Illinois group, to which the Mascoutens belonged, practically wiping them out of existence. Survivors of the "fire people" doubtless were absorbed into other tribes until no trace remained, Dr. Michelson believes, but the tribe itself never revived to any importance.

*Science News Letter, March 31, 1934*

## PHYSIOLOGY

## Carbon Tetrachloride Effects on Body Studied

**H**OW THE fumes of carbon tetrachloride, familiar as a cleansing agent, hookworm remedy and fire extinguisher, affect the digestion, liver and blood was reported by Dr. George M. Higgins of the Mayo Foundation, Rochester, Minn., at the meeting of the American Association of Anatomists.

Dr. Higgins worked with white rats, letting them breathe known concentrations of the chemical for one hour daily. He watched their growth, weight and the amount of food they consumed during this period. Test meals remained in the stomach 62 hours longer than normal. Frequent hemorrhages and inflammation of the digestive tract were observed.

After a single hour's inhalation of the carbon tetrachloride changes appeared in the liver. After 30 hours of inhalation cirrhosis involved the entire liver.

Changes also occurred in the number of red and white blood cells and the amount of hemoglobin, anemia gradually appearing.

*Science News Letter, March 31, 1934*

## CHEMISTRY

## Cotton Takes Most Dye From Weak Solution

**C**OTTON soaks up more dye when the dye solution is weak than when it is concentrated, it is shown by X-ray and photographic studies by Prof. George L. Clark and Dr. Julia Southard of the University of Illinois, reported in *Physics*.

Two common commercial dyes, Nile blue sulfate and methylene blue, were investigated. When the amount of dye in the solution is reduced, the dye molecules gather together in smaller clusters. The aggregations are so small that they get into the pores of the cotton fabric without changing the form of the cellulose that makes up the cotton.

X-ray photographs of dye solutions showed how the cotton picked out and absorbed the smaller clusters of dye molecules. In passing through a dye solution the X-rays are bent in proportion to the size of the clusters. Testing of the dye solution before and after it was used told the story of what happened.

*Science News Letter, March 31, 1934*

ASTRONOMY

# April Evening Skies

**This is Last Chance to See Winter's Stellar Attractions;  
Curious Naming of Constellations by Ancients Had Plan**

By JAMES STOKLEY

**A**PRIL evenings offer the season's last opportunities for us to see the conspicuous constellations that decorated the winter skies.

At about 10 p. m. on the first of the month, 9:00 on the fifteenth and 8:00 on the thirtieth, times at which the skies appear as represented by the accompanying maps, Orion, the mighty warrior, is low in the west. The three stars of his belt are nearly horizontal. Above them is Betelgeuse, and below, Rigel.

Farther to the south is brilliant Sirius, the dog star, brightest of all the stars in the sky. Above is Procyon, marking Canis Minor, the lesser dog. Just to the north of Orion and about the same distance above the horizon, is Taurus, the bull, with the brilliant and reddish Aldebaran.

High in the western sky are the twins, Castor and Pollux, side by side. Pollux, the brighter, is to the south. Shining brilliantly in the northwest is Capella, in Auriga, the charioteer.

Almost overhead in the south is Leo. Like Gemini and Taurus, Leo is one of the twelve constellations that mark the zodiac, the path of the sun, moon and planets. It can be recognized from the "sickle" with the bright star Regulus marking the end of the handle, which points to the south, while the blade curves around to the southwest. The blade forms the head of the lion, while the star Denebola, a little farther to the east and at the apex of a small right triangle, is in the animal's tail.

To the north of the zenith is the great dipper, upside down and easily identified. The stars of the handle of the dipper curve around towards the east, and by following this curve one is brought to another brilliant star, now directly east. This is Arcturus, in Bootes, a star of which much was heard last summer when its light, after travelling forty years, was used to switch on the illumination of the Century of Progress exposition in Chicago.

In the southeast is a very bright ob-

ject whose steady glow shows it to be not a star, but a planet. This is the giant Jupiter, largest member of the sun's family. Just below Jupiter is Spica in the constellation of Virgo, the virgin, another group in the zodiac.

When a person begins to study the stars and their groupings into constellations, he is often surprised at some of the names and wonders how anyone, even with the most active imagination, ever saw such figures around apparently indiscriminate groupings of stars. This is one problem that even the astronomers can not help him solve.

## No Longer Important

As a matter of fact, the astronomer today does not bother about the figures. Years ago astronomers did designate stars by their position in the imaginary figure, and a star was referred to as "the eye of the bull" or "the heart of the scorpion." But now there are other and better ways of designating the stars, and so the constellation has become merely an area in the sky.

Just as the United States is divided into forty-eight states, so the entire sky is divided into eighty-eight constellations. Just half of this number have been invented in modern times, but the other forty-four date back to remote antiquity, and no one knows where or how they originated. Yet the same fig-

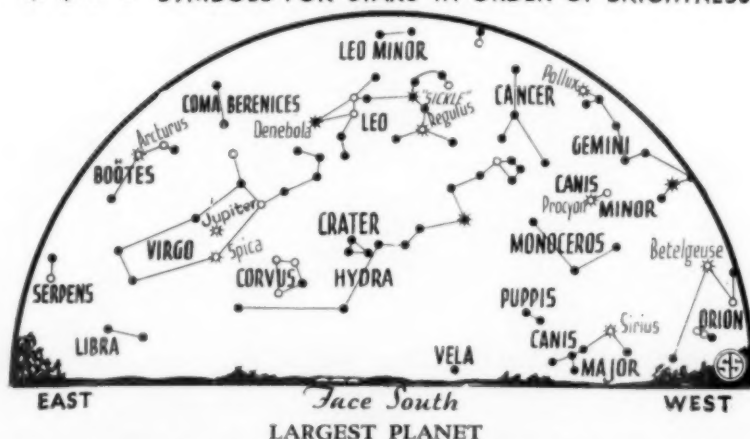
ures are given to the same stars in widely scattered parts of the earth. There is considerable evidence of some plan in the arrangement of the figures, and so it has been suggested that the figures originated in some one place in the earliest days of human history.

Take, for example, the constellation that appears high in the north these April evenings, commonly called the "great dipper." The handle of the dipper points to the east ending in the star Benetnasch. Next is Mizar, and close by is Alcor, a faint star that can be seen by a good eye on a dark night. Then comes Alioth. Megrez is the star where the handle joins the bowl. At the bottom of the bowl, now uppermost, are Phad and Merak, and just below the latter is Dubhe. The last two are the pointers. If you imagine a line drawn between them and extended down it will bring you to Polaris, the pole star, so called because it is close to the north pole of the heavens.

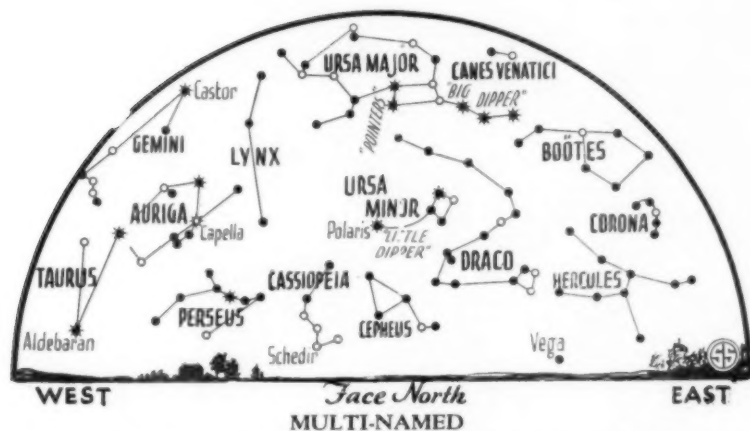
This group has other names besides the "dipper." The English call it "the plough" or "Charles' wain," but on the old star maps it is a bear, Ursa Major. It takes an active imagination to see a bear in these stars, especially when one finds that the handle of the dipper forms the long tail of the bear, a species of bear evidently quite different from any in captivity in zoological gardens today. Yet it was a bear to the Chaldeans, to the Finns, and to the American Indians.

But it seems as if our Indians knew

✧ ✧ ○ ✧ SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS



The only planet visible this month is Jupiter, which is so large that if it were hollow all the other planets could be placed inside with room to spare.



The familiar constellation near the pole star and well known to most Americans as the "great dipper," has several other names. The English call it "the plough" or "Charles' wain," while on old star maps it is a bear, Ursa Major.

their bears somewhat better than the others because they said that the three stars of the handle of the dipper represented three hunters pursuing the bear. The first hunter, they thought, carried a club with which to slay the bear, the second a pot in which to cook his meat (the faint Alcor representing the pot), and the third a bundle of twigs to make the fire. This constellation has also given us a much used word. The Greek word for bear is "arktos"; the northern parts of the earth's surface are those where the constellation of the Great Bear is overhead, hence the "arctic" regions are those under the bear.

### Legend of the Bear

There are many ancient legends about the bear. According to one, this group represents Callisto, the daughter of Lycaon, King of Arcadia. Jupiter was in love with Callisto and Juno was jealous. To protect Callisto from the wrath of his wife, Jupiter had her turned into a bear. However, he neglected to inform Callisto's son, Arcas, of the change. That precocious youngster saw the bear and was about to kill her, not knowing that she was his mother, when Jupiter changed him into a bear also and placed both in the sky, out of harm's way.

Callisto is Ursa Major; Arcas is Ursa Minor, the little bear. He, too, has a long tail, even longer in proportion to his body than that of the greater bear. The pole star is at the tip of the little bear's tail. This latter group is also called the "little dipper," and here again the tail of the bear and the handle of the dipper are made of the same stars.

Just in front of the great bear is a region containing no very bright stars,

and there is a similar region to the rear, just south of the handle of the dipper. The ancients, who named the constellations, paid no attention to these regions, and so for ages the few stars that could be seen in these parts of the sky belonged to no constellation. In 1610, however, astronomers began to use the telescope to observe the stars, and then they discovered bodies that had previously been invisible. This made the introduction of new constellations necessary.

Some of the most important were invented by the Polish astronomer Hevelius, in 1687. Then he published his famous set of maps, the "Firmamentum Sobiescianum," dedicated to the Sobieskis, the ruling family of Poland. In this work he showed a number of new constellations, most of which have been retained.

At the rear of the bear, pursuing him, he placed the two hunting dogs, Canes Venatici. In front he placed Lyncis, the lynx, because, it was said, the keen eyesight of a lynx is needed to see stars in this region. In other parts of the sky he placed Leo Minor; Vulpecula, the fox; Sextans, the sextant; Scutum Sobieskii, or Sobieski's shield, and Lacerta, the lizard. Another large group of modern constellations was introduced when astronomers began to observe the heavens from the southern parts of the earth and saw stars which never rise above the European horizon.

Only one planet is visible in the April evening sky. This is Jupiter, which can be seen low in the southeast. Its brightness, greater than that of nearby stars, and its steady glow, so different from the scintillating brilliance of the stars, immediately distinguish it and prove it to be a planet. Just below is the star

Spica, marking Virgo, the virgin.

Jupiter is the largest of the planets including our earth that revolve around the sun and form the solar system. The earth is only 7,918 miles in diameter, Jupiter 86,718 miles, so that 1,300 earths would be required to make a planet as large. Jupiter is so large that if it were hollow, all the other planets could be placed inside with room to spare. However, it is minute compared with the sun, for that body, with a diameter of 864,392 miles, is about a thousand times as large as the planet.

All the other naked-eye planets are morning stars, to the west of the sun and visible, if at all, just before sunrise. Mars is close to the sun, where it cannot be seen at all this month. Then comes Mercury, which may be glimpsed early in the month when it is farthest west. Still farther west shines Venus, a brilliant object in the morning twilight, like it was a few months ago in the evening. Saturn, much fainter, is above and to the south of Venus.

During April the moon is at last quarter on the sixth, new on the thirteenth, first quarter on the twenty-first and full on the twenty-ninth. This means that the last half of the month we will enjoy moonlit evenings.

*Science News Letter, March 31, 1934*

### ZOOLOGY

## Darwin's Route Followed; Strange Animals Studied

**S**NAKELESS as Ireland itself, is southern Chile, homeland of the "Irish" potato. So Dr. W. H. Osgood, curator of zoology at the Field Museum of Natural History, said, in an address given under the auspices of Science Service.

Dr. Osgood was telling of a scientific pilgrimage that followed the trail of Charles Darwin, famous as the apostle of evolution, who a hundred years ago made a memorable world voyage which started him on his revolutionary career. It was along the coast of South America and on the nearby islands that Darwin saw many of the strange animal species which could be accounted for most readily by the theory which he later evolved.

The coypu or nutria, source of a soft, beaver-like fur familiar to the trade, was one of the interesting animals encountered by Dr. Osgood on his expedition. Like the beaver this animal is aquatic, but lacks the broad, flat tail that aids its North American cousin in swimming. Its most peculiar feature is



the development of the female animal's milk glands on her back instead of on the underside of her body, so that the young may nurse while she carries them through the water. One coypu which Dr. Osgood kept in his camp for a time would eat nothing but potatoes.

Although there are no snakes in southern Chile, there are plenty of frogs and toads, Dr. Osgood said. He gave an account of one species which was discovered by Darwin and has been named for him.

"It is a tiny little chap scarcely more than an inch long," he said, "bright green in color, and it has a sharp little

proboscis on its nose. In this species the eggs, after being laid by the female, are picked up by the male and held in his mouth or in a pouch in his throat. He carries them here until the fully formed young are hatched, for in this frog there is no tadpole stage. As the embryo frogs develop, the pouch extends backward between the skin and muscle of the abdomen until it occupies the whole abdominal area, giving their father, who acts as a sort of brooder, a very bloated appearance. Meanwhile, the female parent, the mother, has no further responsibility."

*Science News Letter, March 31, 1934*

#### MEDICINE-PHYSICS

## Cancer to be Studied With Use of New Heaviest Water

**H**EAVERY water, the new chemical wonder, will be used shortly in experiments upon the growth of cancer cells as a part of the extensive investigation of the heavy hydrogen twin element being directed by Prof. Hugh S. Taylor, of Princeton.

The cancer experiments will be of "extraordinary interest," Prof. Taylor predicted. They will be begun when larger supplies of heavy water are accumulated at Princeton.

By summer from 12 to 15 pounds of the purest heavy water will be available for the Princeton researches. The daily output is now 3 grams (1/10 ounce) of heavy water containing 100 per cent. deuterium (heavy hydrogen). The production cost is approximately \$5 per gram.

Heavy water produced in Princeton's Frick Chemical Laboratory is the heaviest heavy water so far produced. It has a specific gravity at least two-tenths of one per cent. greater than that recorded earlier by Prof. G. N. Lewis of the University of California. The Princeton specific gravity is 1.1078 at 77 degrees Fahrenheit (25 degrees Centigrade) as compared with the California value of 1.1056. The determinations were made by Dr. P. W. Selwood, using in all three ounces of heavy water which failed to increase in density after repeated processes of refinement. For this reason it is believed that pure deuterium oxide has been obtained.

Synthesis of ammonia, wood alcohol and other chemicals will be aided by

heavy hydrogen researches carried out at Princeton. It was found that light hydrogen molecules will react with deuterium molecules to produce mixed molecules, with one atom each of light hydrogen and deuterium, at temperatures as low as that of liquid air, using catalysts such as chromium oxide. These results indicate that the high temperatures necessary in industrial syntheses are required, not for the activation of the hydrogen, but for the activation of the molecules with which the hydrogen has to react. If surfaces can be found as active towards these molecules as present available surfaces are with respect to hydrogen, tremendous improvements would be possible in the yields of ammonia and alcohol under much simpler operating conditions. The deuterium experiments indicate the direction which research in technical catalysis must take.

Prof. Taylor recently reported to the Franklin Institute, Philadelphia, his experiences with heavy hydrogen as a new research tool.

*Science News Letter, March 31, 1934*

Except in a downpour, the sound of raindrops is too faint to be recorded for use in the movies, and ordinarily rain sounds are made with a machine.

A safety expert says that accidental deaths due to falls in the home can be reduced 85 per cent. if housekeepers will provide such equipment as adequate lighting, strong stair rails, non-slip rugs, and sturdy ladders.

#### NUTRITION

## Females Stand Deficient Diet Better Than Males

**W**HEN it comes to eating a diet deficient in proteins for a prolonged period, the female of the species can take it better than the male, it appears from studies of rats reported by Dr. C. M. Jackson of the University of Minnesota to the American Association of Anatomists.

From the age of three weeks, litter mates were kept on the same protein-deficient diet for fifteen weeks. Then they were fully refed the normal stock diet for laboratory rats. On refeeding, the test females at first grew more rapidly when compared with females that had not been on the protein-deficient diet, overtaking these control animals in about 20 weeks and thereafter maintaining about the same average weight as the animals that had had full diets from the start.

The males when put back onto the full diet also grew more rapidly than normal, but never quite caught up to the control animals. At the age of one year, when rats had nearly stopped growing, they were still considerably behind in average weight.

"Although individual variations occur even within the same litter, the test males in general apparently remain permanently subnormal in body weight while the test females fully recover," Dr. Jackson stated.

This sex difference in resistance was also evident from the deaths occurring during the experiment. About three times as many males as females died among the test animals, but there were no deaths among the controls.

*Science News Letter, March 31, 1934*

#### ENGINEERING

## Fire Fighting Helped By Calculation of Gases

**J**UST how much nitrogen, carbon dioxide or other inert gas needs to be released in a warehouse to stop a fire can now be computed as a result of mathematical methods developed by Dr. S. H. Ingberg of the U. S. Bureau of Standards, reported in *Physics*. His calculations also apply to the reverse situation, the flushing out of a toxic gas from an enclosure so that its atmosphere will be sufficiently pure to allow workers to enter.

*Science News Letter, March 31, 1934*

## PSYCHOLOGY

# Child's Growth in Capacity Precedes His Achievements

THE CHILD'S record of achievement should be distinguished from his progress in maturity or growth. The former does not always keep pace with the latter, Dr. T. Wingate Todd, Western Reserve University, told officers of the Mooseheart Laboratory for Child Research and others gathered in Washington for a Conference on Child Development, Care, and Training.

"Physical growth of the body covers some twenty years in human life, but physical growth of the brain is practically completed in six years, and in the better-nurtured children in four," Dr. Todd said.

The speed with which the child's achievements follow after his development makes them possible, depends upon his opportunities for education, he explained.

"Capacity for walking is attained at twelve months or soon afterward, but capacity for riding a tricycle is not attained until about three years. The achievement of these accomplishments is, however, not necessarily completed at these ages.

"By comparison with anthropoid growth, a child's life has four significant subdivisions namely: infancy (birth to two years), the preschool period (two to six years), the grade school period (six to twelve years) and adolescence (twelve to eighteen years). In human life, infancy and the grade school period are greatly prolonged for in the anthropoid these occupy about one year and two years respectively.

"Until the school plateau in physical maturity is reached, the better nurtured children are physically the larger and mentally the more advanced. After the attainment of six years bodily growth continues but the so-called mental growth is really a mental expansion depending upon the integration of experience in a brain which already has the functional capacity of adult structure."

The problems of adolescence are a result of the rapid spurt of maturity at that time, Dr. Todd explained.

"The attainment of adolescence is a feature of maturity progress rather than a stage in physical growth," he said.

"It is expressed in certain physical features which are intimately related to the mental outlook but social perspective and emotional balance depend upon the educational processes of experience. This is the clue to the differentiating personality.

"In a phase of rapid progress in maturity, such as occurs towards the second birthday or at puberty, change in outlook outruns the accumulation of experience and temporary disharmonies result in problems of social perspective and emotional balance.

"It is therefore during these periods when adjustment taxes the child's developing personality that understanding, patience and skill on the part of the guardians are of greatest significance in the developing citizenship-value of the child."

*Science News Letter, March 31, 1934*

## CHEMISTRY-ENGINEERING

## Molecules Packed on End In Best Lubricating Oil

ONE OF the hardest questions to answer has been why two oils almost identical in density, viscosity, and other common physical properties, may differ widely in their lubricating qualities. One cannot tell by any simple physical test, in advance of actual use of the oils, which will be the better lubricant.

Chemists have discovered that the molecule of a good lubricant consists of a long chain of atoms, so that the molecule has the form of a long slender filament. These molecules stand on end on a metallic surface, one end adhering firmly to the surface. In this way they pack very closely together, and pressure between two surfaces cannot squeeze them out.

A second layer of oil molecules stand on top of the first layer, another on that, and so on. Two metallic surfaces thus ride on velvety cushions and slide easily on each other.

The longer the filaments, and the more regularly and closely packed they are, the better is the lubricant.

These facts have been disclosed by the use of X-rays.

A new mode of testing has been applied by Dr. C. A. Murison and is reported in the London Philosophical Magazine. Dr. Murison directs a stream of electrons at a glancing angle at a film of oil and studies the diffraction pattern produced by the reflected electrons. From this he can tell at once the lubricating qualities of the oil. He found for one thing that oils of high molecular weight are superior.

Electron diffraction, it may be remembered, was discovered by Drs. C. J. Davisson and L. H. Germer of the Bell Telephone Laboratories in 1927, and demonstrated the wave properties of electrons predicted by Duc Louis De Broglie and Prof. E. Schroedinger.

An answer is thus given to those who want to know what is the use of all these recondite researches into atoms and electrons, for here is an application of great practical value.

*Science News Letter, March 31, 1934*

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19/23

## ENGINEERING

# Build Railroad Cars Like Automobiles, is Suggestion

**S**TREAMLINED railway passenger cars that would become obsolete and be replaced as rapidly as automobiles were suggested by William B. Stout, automobile and airplane designer, as both a depression remedy and as a technical advance in railroad rolling stock construction.

Mr. Stout, who explained that he is carrying the viewpoint of the automobile and airplane engineer into the rail transportation field, has given expression to his advanced ideas in the construction of the railplane. This is a light-weight, streamlined, 50-passenger car powered to cruise at 60 miles per hour by two standard motor-bus gasoline engines. Technical advance, according to Mr. Stout, should make the railplane obsolete in from three to five years so that it would have to be replaced by more efficient equipment.

In addition to employment given by such rapid replacement construction, the light weight cars would operate in only one-, two- or three-car trains to give more frequent service and to increase employment of train crews. The light weight and streamlines of the car make its operation much more economical than that of present standard steam equipment. For example, the gasoline consumption of the railplane at 60 miles per hour is only a gallon every six miles.

Success of the railplane idea, both for providing faster, more frequent and more comfortable transportation and for increasing employment, depends upon the use of the car in such quantity that mass production is possible. Mr. Stout told the Washington branch of the Society of Automotive Engineers that cost of building only 100 cars at the present time would be about \$30,000 per car. He estimated that if thousands of cars were built at the same time this figure would be fractioned.

The railplane is now being examined and tested by railroad engineers and officials. It weighs 26,000 pounds complete, is 60 feet long and has a top speed of 90 miles per hour.

"Both ends of the car are rounded off and retractable steps reduce wind drag," Mr. Stout stated. "Sidewise as

well as endwise streamlining has been embodied into the design to take care of cross-winds when the car is in operation.

"A standard power plant now in production was used in order to keep costs down. To be accessible and to be kept away from the body so that passengers would get no vibrations, the entire power plant mechanism was mounted below the car on the forward truck, the engines being located outside the truck beyond the wheels.

"Body framework is of welded chrome molybdenum steel tubing, similar to airplane fuselage framework practice. Neither bolts nor rivets are used. Covering is a dural skin which takes only a small proportion of structural stresses.

"Windows in the car are sealed, air conditioning apparatus being provided. Air passed through the radiators heat the car. Safety glass is used in all windows. Rubberized hair is used for body insulation, while in the trucks and engine mountings rubber cushioning members further reduce transmission and vibration noise."

*Science News Letter, March 31, 1934*

## PHILOSOPHY

## New Book is First of Non-Aristotelian Library

**T**HE IDEA that the whole of a living thing's activity, that the responses of the organism as a whole on the emotional as well as the intellectual side should be evaluated, is given expression in a new book by Alfred Korzybski titled "Science and Sanity." (International Non-Aristotelian Library Publishing Co., Lancaster, Pa. \$7.)

It is the first volume of a proposed Non-Aristotelian Library. Eleven other volumes are announced as being in preparation, and no less than fifty-two titles are suggested for publication in the future which "will embrace all known doctrines and human interests."

The seriousness of the project is attested by the present volume which displays a wide range of erudition, and by the opinions of a number of our lead-

ing scientists which are quoted in the book and reproduced in extenso on the advertising cover. The theme of the book is the assertion that mankind has adopted hitherto the Aristotelian system of expression which makes use of elementalistic terms in describing our conscious reactions. The central fault of the Aristotelian system is the use of the "is of identity." The result is an animalistic mentality, an unsanity, which can be corrected only by a change to a non-Aristotelian system. This latter system is based on "fundamental negative premises; namely, the complete denial of identity," and calls for a new linguistic expression of non-elementalistic structure.

To illustrate the mode of building up such a language through successive orders of conscious abstracting, the author makes use of a diagram, designated as the "structural differential," in which he attempts by means of a simple model to portray the relations of an event to its objectification in consciousness and to the name or label attached to it. The event, an apple for instance, as a mass of matter has an infinite number of characteristics dependent on the dynamic activity of its constituent parts, the "mad dance of electrons." In consciousness, by a first order of abstraction, the event becomes an object with a limited or finite number of characteristics through which it is recognized, and in man we give this object a name making use of still fewer of its characteristics. These relations are exhibited in the model and convey to the eye the lesson that the name is not identical with the object, nor the object with the event. The author believes that by means of such a model proper semantic reactions may be developed in the young as well as in adults and a greater sanity be introduced into the language and thoughts of mankind.

The book is difficult reading. But whether or not one grasps fully the author's meaning his presentation is stimulating and thought-provoking. At times the difficulties are increased unnecessarily, especially on the physiological side, by a naive acceptance of questionable theories. Dr. Wilder D. Bancroft's idea of a dependence of mental states on the colloidal condition of nervous matter is treated as a demonstrated fact and made the basis for generalizations which to the physiologist seem to be unwarranted and without significance.

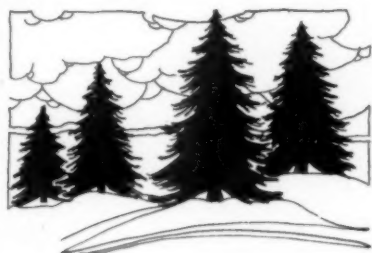
*Science News Letter, March 31, 1934*



ECOLOGY

## NATURE RAMBLINGS

by Frank Thone



Plant Pioneers

**P**LANT communities in the far North are as mixed-up and disorderly as human communities in a newly-opened gold-rush country, and for essentially similar reasons. Just as in an absolutely raw pioneer settlement you find miner and banker, gambler and preacher, bar-keeper and doctor all rubbing elbows simply because the land is pioneer and there has not yet been time for society to stratify and each man to find his own niche, so in the Arctic you find "upland" and "lowland" trees, bog plants and dry-land plants, all in a grand anarchic jumble because the land has been open to plant settlement, too, for only a comparatively short time and things haven't stabilized themselves there yet as they have here in the temperate zone, where beech associates with maple but not with oak, and where cactus is accepted in a sage-brush society but cannot make its way among the close-shouldering haughty grasses of the moister meadows and prairies.

This key to the riddle of botanical anarchy in the Arctic has been found by Prof. Robert F. Griggs of George Washington University, after he had racked his wits over it in vain through half-a-dozen expeditions into Alaska and other northern lands.

The solution to the puzzle of Arctic vegetation was reached first by Dr. Griggs when he discovered evidence that the forest front in Alaska is advancing, and advancing rather rapidly at that. Then came the finding of Norse burials in the old Greenland colony, where the skeletons were dug out of perpetually frozen soil, yet penetrated with the roots of trees—indicative that the climate has become more rigorous since the Viking days in Greenland, a

thousand years ago. These and other evidences pointed to a genuine recency in the exposure of Arctic soil to seeding by plants. Arctic soil is new soil, juvenile, even infantile soil. It is anybody's race to see who arrives first, and any plant that manages to get itself rooted holds its place in the sun, with little competition or crowding from its neighbors and only the rigors of the climate and the difficulty of sucking a living out of the raw earth to limit its opportunities.

The higgledy-piggledy, casteless disarray of Arctic vegetation Dr. Griggs has likened to the equally mixed and chancy distribution of wild plants—mostly weeds—found on fallow plowland. Indeed, Arctic soil is like plowland to some extent, being constantly worked and overturned by frost action, so that no plant is guaranteed a permanent roothold.

Arctic plants are not merely like weeds. Many of them actually are weeds. Very prominent in Arctic plant society are such species as dandelion, sheep-sorrel, chickweed, narrow-leaved plantain, smartweed, yarrow and fireweed. Meek but tough and enterprising, these have inherited the Arctic earth.

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SOCIOLOGY

## Race Crossing Inevitable Where Races Are Neighbors

**N**AZIS in Germany, the late unlauded Klan in this country, nativists and pure-race enthusiasts everywhere, have nought but their pains for their labors in any land where two or more different races live side by side. The races will inevitably mingle blood.

"Among the few statements that the scientist who studies human beings may make without fear of serious contradiction is that human groups do not meet but that they mingle their blood-streams," said Prof. Melville J. Herskovits of Northwestern University, in an address given in Chicago recently under the auspices of Science Service.

Not even the almost universal tendency of peoples to persecute and penalize the racial hybrid serves to prevent race crossing, Prof. Herskovits declared. In our own West the "squaw man" was an object of contempt, and his sons looked down upon as "half-breeds"; in India, where not merely to

SEISMOLOGY

## Desert Earthquake Opens Deep Crack in Ground

See Front Cover

**J**UST suppose the half-mile long earth crack, a portion of which is pictured on the front cover of this week's SCIENCE NEWS LETTER, had split into being beneath the business district of a big city. It was created with a shock estimated to have been stronger than the one that damaged Long Beach, Calif., on March 10, 1933.

Fortunately its location was the desert near the northeast edge of Great Salt Lake, latitude 41.6 degrees north and longitude 112.7 degrees west, according to final calculations of seismologists. Date, March 12. (See SNL, March 17, p. 169; March 24, p. 184.)

So strong was this earthquake that it registered on instruments at the U. S. Coast and Geodetic Survey observatory at Cheltenham, Md., that are primarily intended for recording the magnetic field of the earth. For ten minutes at the time of the main shock the magnetic needle wrote a record of earth tremors, and in the afternoon another shock set it in motion for eight minutes.

*Science News Letter, March 31, 1934*

mate with but even to touch an outcaste merits eternal damnation, intercaste children are born none the less.

These offspring of race crossing offer the student of human heredity his most interesting, perhaps his best, opportunity to study the Mendelian mode of inheritance, insofar as it affects human beings; for obviously not even the most enthusiastic eugenicists can pen up young men and women like guinea pigs.

One of the really well assured results of such studies, Prof. Herskovits stated, is the establishment of the wholly fictional character of the "throw-back" tar-colored baby, born to parents with slight traces of Negro blood in their veins. We can depend upon children of mixed ancestry to "average" between their parents in skin color, hair character and other racial marks. If a black baby is born to such parents, something besides remote ancestry is amiss.

*Science News Letter, March 31, 1934*

# ●First Glances at New Books

## Agricultural Economics

**AGRICULTURAL ADJUSTMENT**—Transmitted by C. C. Davis—*Govt. Print. Off.*, xi+393 p., 25c. In this report of the administration of the Agricultural Adjustment Act for the period May, 1933, to February, 1934, Mr. Davis and his aides give an accounting of their stewardship: why they have done what they have done, what they have accomplished, and what they still hope to do. Separate and detailed consideration is given to each of the basic crops on which regulation has been undertaken, and extensive appendices give details of benefit payments, etc., as well as facsimile reproductions of production adjustment contracts.

*Science News Letter, March 31, 1934*

## Sociology

**AN ORIENTAL VIEW OF AMERICAN CIVILIZATION**—No-Yong Park (Pao)—*Hale, Cushman, and Flint*, 128 p., \$1.50. A Chinese student with a Ph.D. degree from Harvard interestingly weighs the good and bad points of American and Chinese civilizations. His approval is for the happy medium. But he declares for himself that if he had to choose between two extremes—the Oriental's acceptance of things as they are, or the American's dissatisfied "hustling"—he would choose the latter evil. Reading through the book is like spending an hour or so in conversation with this thoughtful, humorous, Chinese student of life—a worth while experience.

*Science News Letter, March 31, 1934*

## Library Science

**REFERENCE BOOKS OF 1931-1933**—Isadore G. Mudge assisted by Constance M. Winchell—*American Library Assn.*, 87 p., \$1.25. This third informal supplement to the *Guide to Reference Books* is a useful and necessary tool for any librarian or research worker.

*Science News Letter, March 31, 1934*

## Parasitology

**PLANT PARASITIC NEMATODES AND THE DISEASES THEY CAUSE**—T. Goodey—*Dutton*, xx+306 p., \$6.75. Popular conception of danger to plants is almost wholly summed in one sub-phylum of the vegetable kingdom and one of the animal: fungi and insects. Much needed is a focusing of our attention on the many other enemies of our crops, pastures and trees; and not the least among these are the little

thread-like worms of the soil that are the vectors of many known plant diseases and probably of many others as yet undiscovered. In gathering and condensing knowledge of the subject into one solid but convenient text-and-reference book, Dr. Goodey has made not only phytopathology in particular, but also agronomy, horticulture and forestry as well, his debtors.

*Science News Letter, March 31, 1934*

## Botany

**USEFUL WILD PLANTS OF THE UNITED STATES AND CANADA**—Charles Francis Saunders—*McBride*, 274 p., \$3. A new and revised edition of an interesting book written from a unique viewpoint. It may well be that in appropriating such Indian crops as maize, potato and tobacco, the European invader of the Western World has not yet realized to the full the usefulness of its native flora.

*Science News Letter, March 31, 1934*

## Conservation

**OUTDOOR INDIANA**—James H. Vandenberg, editor—*Indiana Dept. of Conservation*, monthly. A new periodical, designed to bring to the attention of Hoosiers, as well as of strangers without their gates, the beauties and resources of the state of Indiana. The first issue, dated February, 1934, concerns itself with such diverse things as erosion control, beekeeping, crow eradication. One highly interesting activity announced here is the drive for the formation of conservation clubs in every community, a movement worthy of emulation in 47 other states.

*Science News Letter, March 31, 1934*

## Pathology

**STUDIES ON HISTOMONIASIS, OR "BLACKHEAD" INFECTION, IN THE CHICKEN AND THE TURKEY**—Ernest Edward Tyzzer—*Am. Acad. Arts and Sciences*, 71 p., 6 pl., \$1.75. A reprint from the *Proceedings of the American Academy of Arts and Sciences*, summing up the steps in a brilliant conquest of a previously troublesome and highly expensive disease of domestic birds.

*Science News Letter, March 31, 1934*

## Travel—Archaeology

**GREECE AND THE AEGEAN**—Ernest A. Gardner—*McBride*, 254 p., \$2.50. A handbook on Greece, ancient and modern but stressing ancient Greek splendors, and designed for the traveler who is eager to see and understand as much as possible of that important country. The author is a British archaeologist, a well-known university teacher of archaeology, and a longtime resident of Greece. From these qualifications and experience he has produced a very helpful and informative work. Several chapters are devoted to Greek islands, the coast of Asia Minor, and Constantinople.

*Science News Letter, March 31, 1934*

## General Science

**CARNEGIE INSTITUTION OF WASHINGTON YEAR BOOK, No. 32, 1932-33**—*Carnegie Institution of Washington*, 388 p., paper \$1, cloth \$1.50. As the annual summary of the many and far-flung researches of a great research organization, this year book records some of the most important current progress in science.

*Science News Letter, March 31, 1934*

## Physics

**SOUND**—E. Laurence Palmer—*New York State College of Agriculture, Cornell University*, 31 p., 20c. How fortunate are the youngsters of today who have such interesting pamphlets as this to guide them in their first steps in science. This is one of the monthly Cornell Rural School Leaflets and it is to be hoped that children in city schools as well will have the opportunity of using it.

*Science News Letter, March 31, 1934*

## Philosophy

**SCIENCE AND SANITY**—Alfred Korzybski—*International Non-Aristotelian Library Publishing Co.*, Lancaster Pa., 798 p., \$7. See page 206.

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## Chemistry

**A FIRST BOOK IN CHEMISTRY**—Robert H. Bradbury—*Appleton-Century*, 633 p., \$1.80. A textbook for high school use now in its third edition.

*Science News Letter, March 31, 1934*

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